

Software Engineering 1

Library Management System

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INTRODUCTION

This library management system is a web-based application designed to facilitate efficient book management for users.

The system provides a user-friendly interface for searching, borrowing, and filtering books by category or title of book.

It utilizes JavaScript for dynamic interaction and incorporates features like per refresh stock updates, borrowing constraints, and category-based filtering.

By automating traditional library functions, this system aims to enhance user experience and streamline library operations.

ANALYSIS AND DESIGN

USER REQUIREMENTS:

- Ability to view all available books with details like title, author, subject, publication date and stock.
- A search functionality to quickly locate specific books.
- Filtering options based on book categories like "Science", "Literature", and "Programming."
- Real-time stock levels after each page refresh.
- User-friendly notifications when books are out of stock or search criteria do not yield results.

SYSTEM REQUIREMENTS:

Functional Requirements:

- **Book Management:**

Display all books dynamically, showing essential details (title, author, category, publication date, stock).

- **Borrowing System:**

Allow users to borrow books while updating stock levels in real time. Handle borrowing limits based on stock availability.

- **Search Functionality:**

Users can search books by title, with the system providing error notifications for unsuccessful searches.

- **Filter Feature:**

Enable filtering of books based on categories such as "Programming" or "Fiction".

- **Responsive Interaction:**

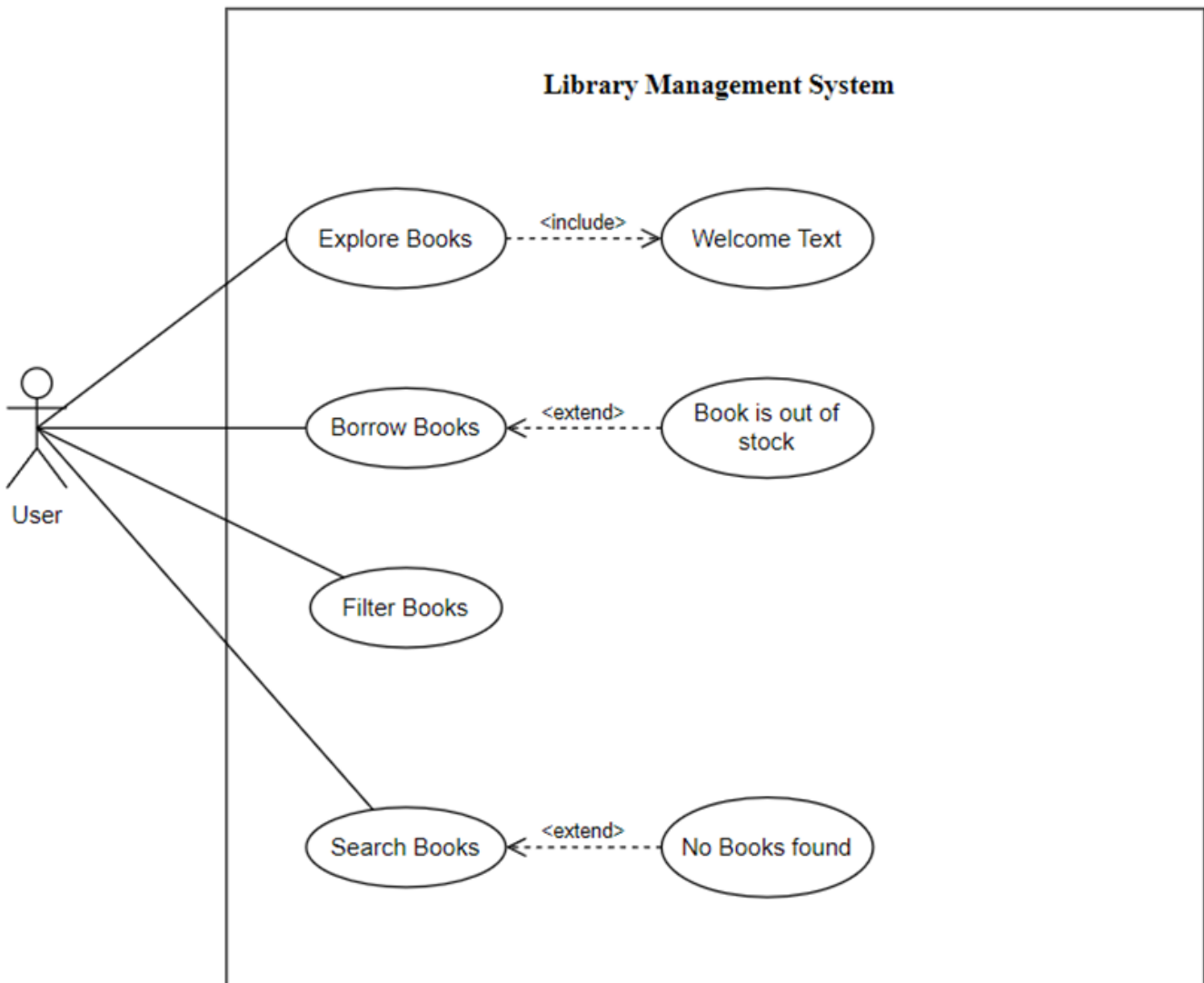
Provide feedback through User-friendly notifications (success messages after borrowing , error messages after unsuccessful searches).

SYSTEM REQUIREMENTS:

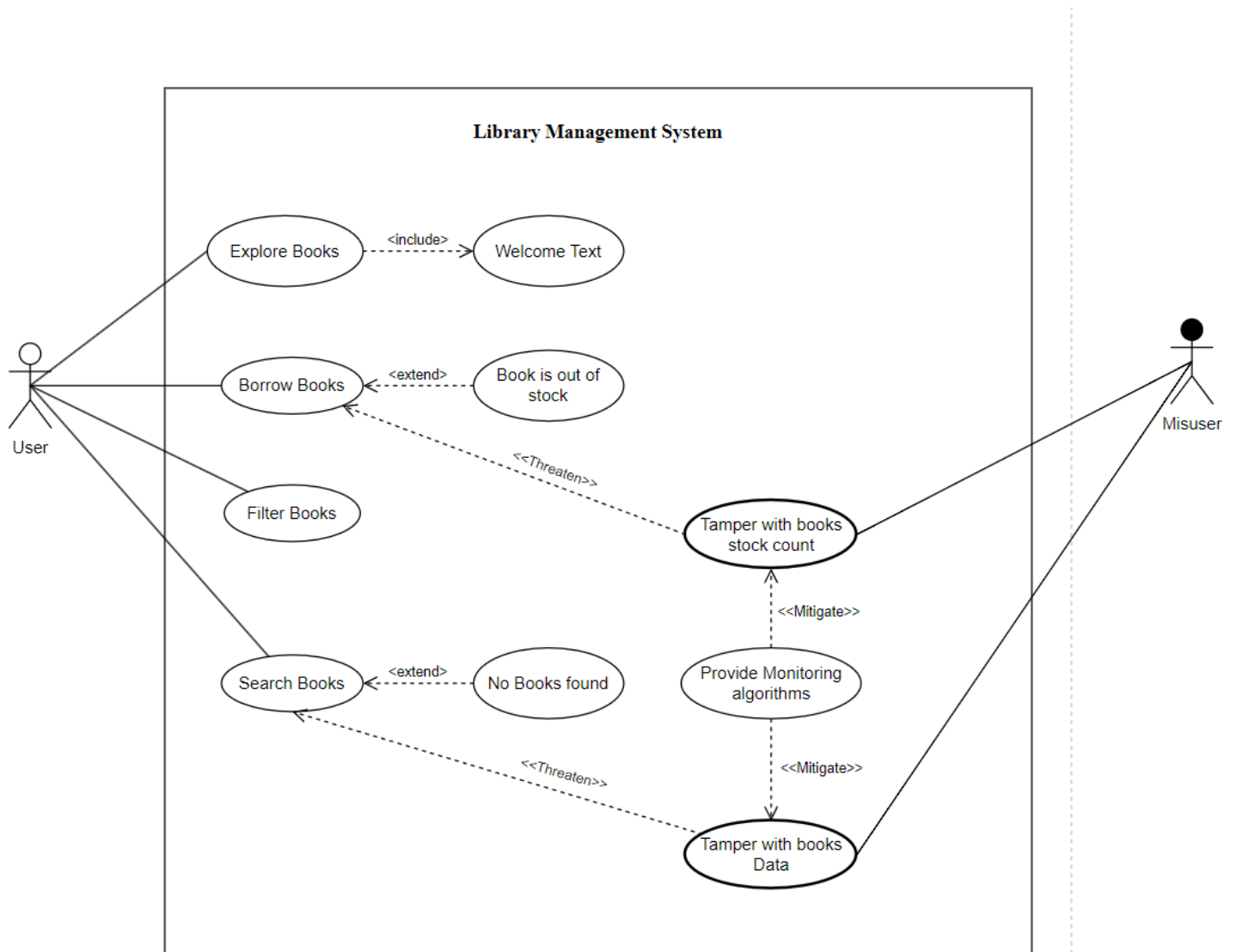
Non-Functional Requirements:

- **Performance:**
Ensure quick load times and smooth filtering/searching, even with a large dataset of books.
- **Usability:**
Maintain an intuitive and user-friendly interface for library users.
- **Reliability:**
Guarantee that stock levels are updated accurately in real-time after user actions.
- **Compatibility:**
The application should work seamlessly on major browsers like Chrome, Firefox, and Edge.

USE CASE DIAGRAM

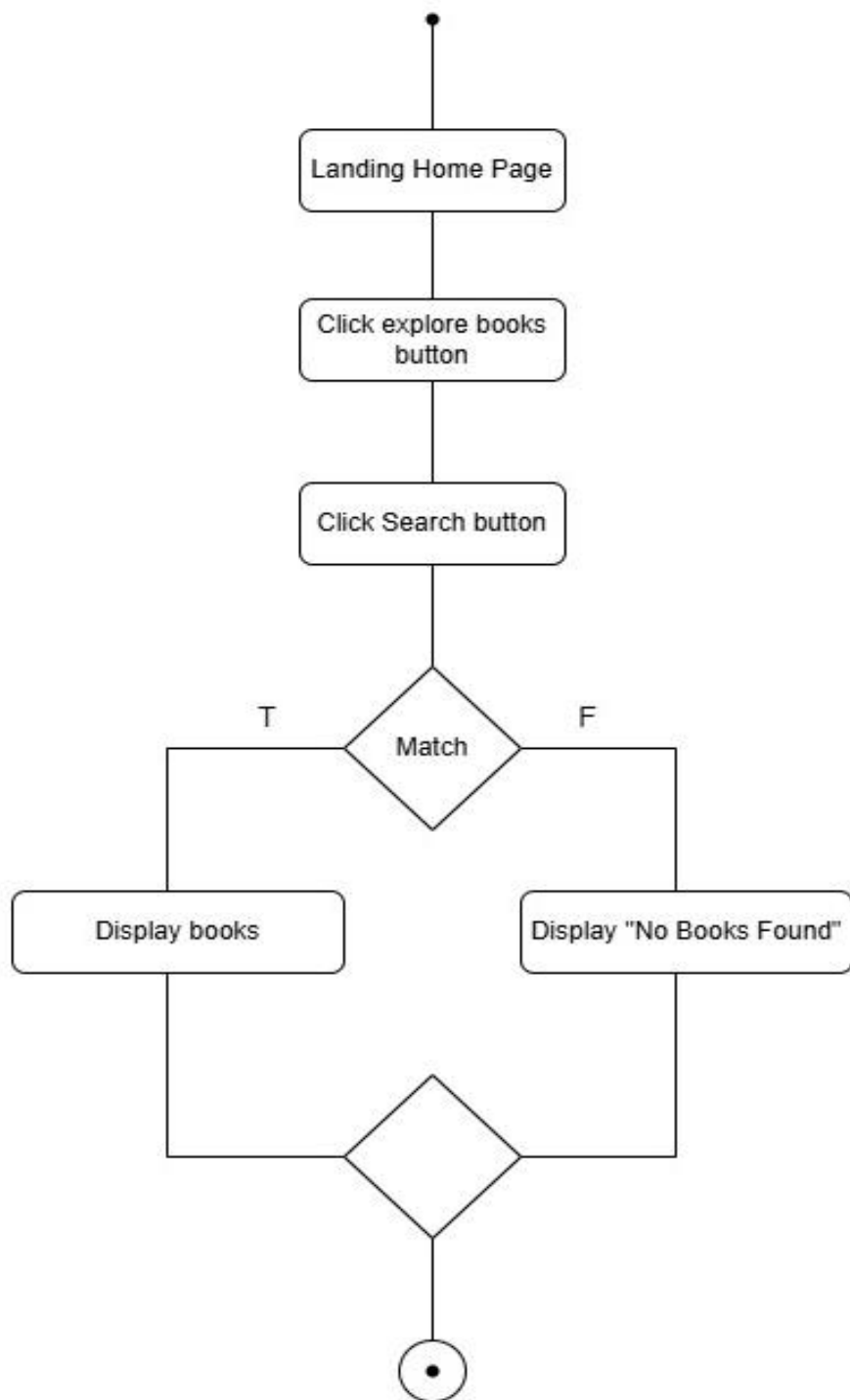


MISUSE CASE DIAGRAM



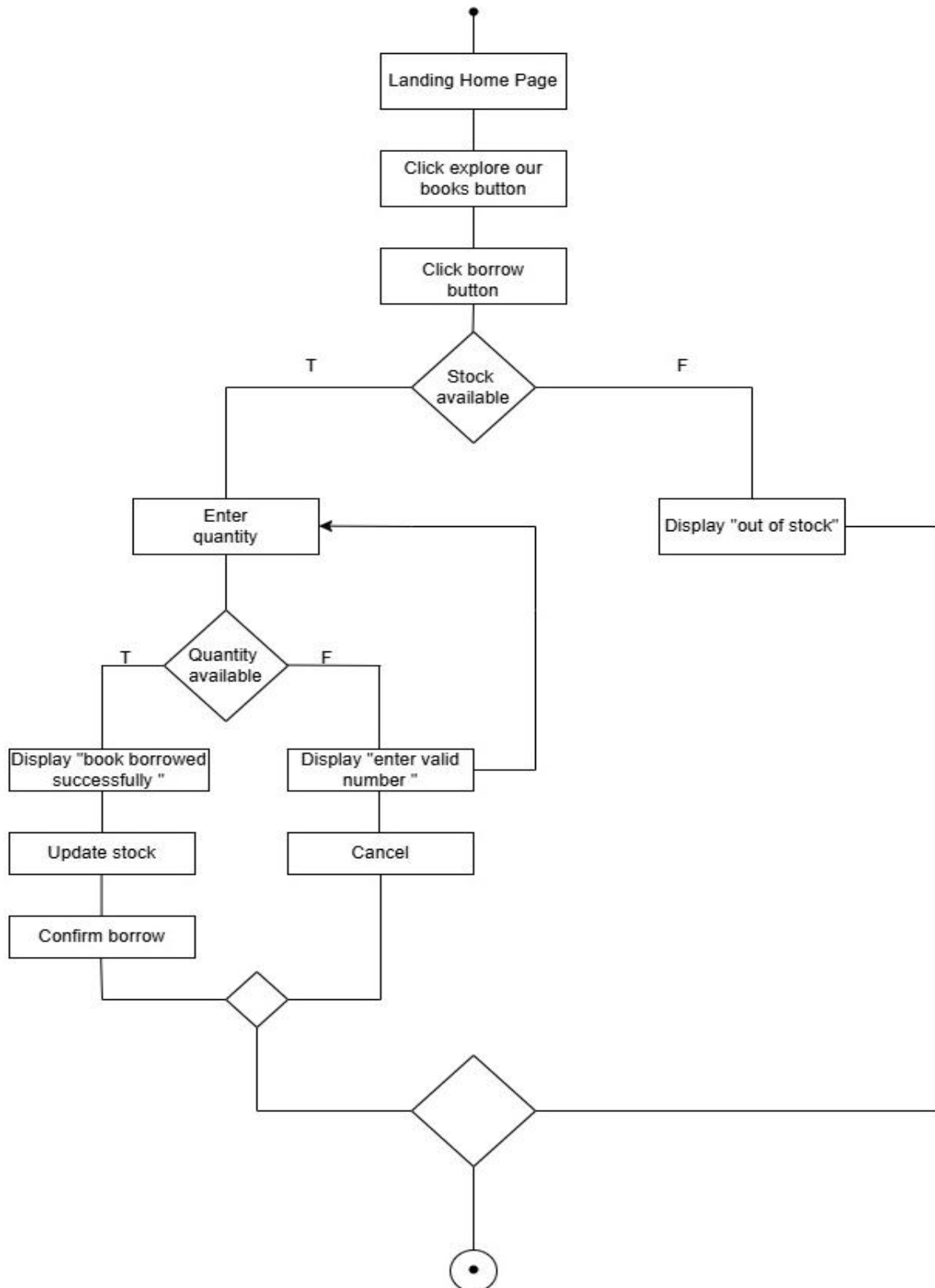
ACTIVITY DIAGRAM FOR SEARCH

Activity Diagram For Search



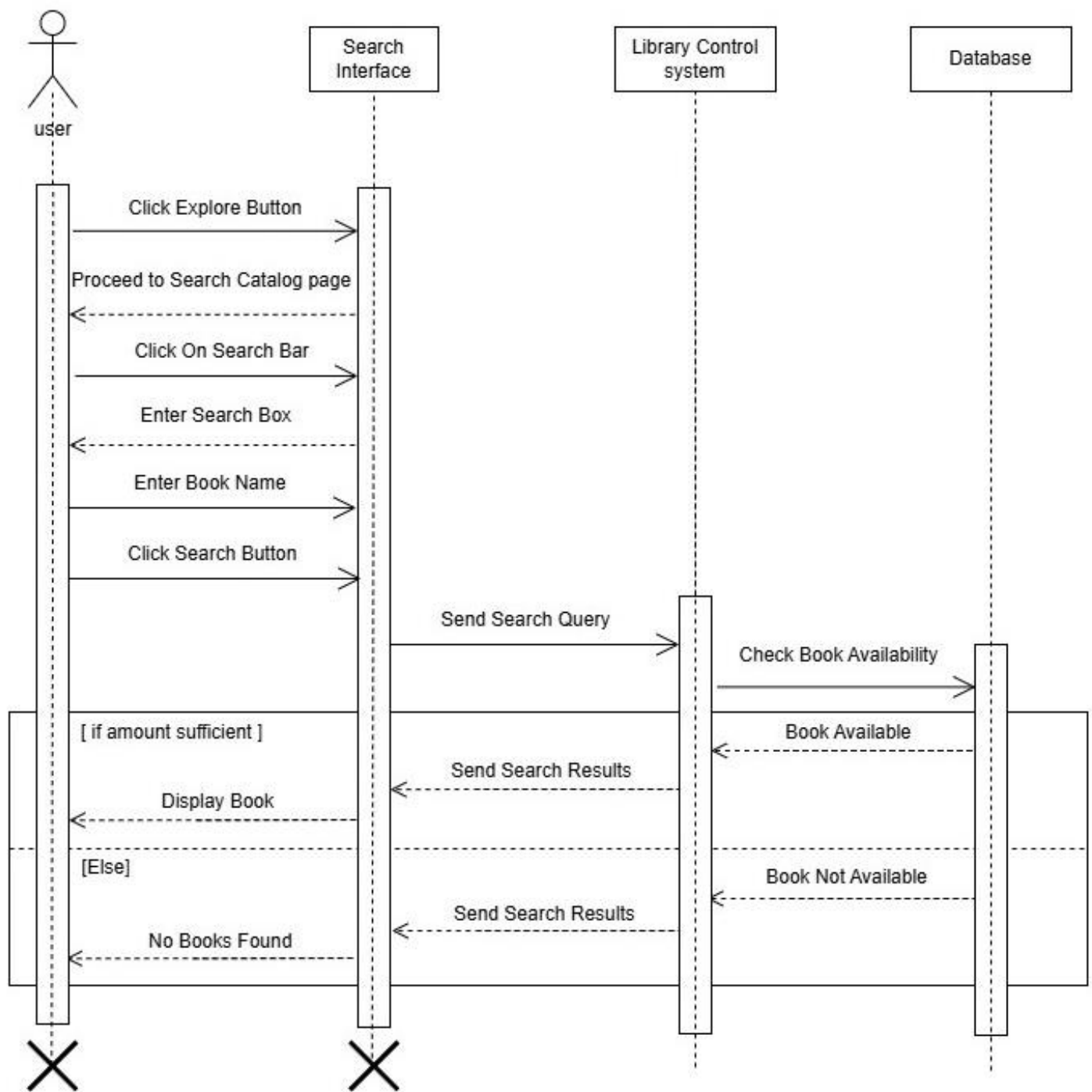
ACTIVITY DIAGRAM FOR BORROW

Activity Diagram For Borrow



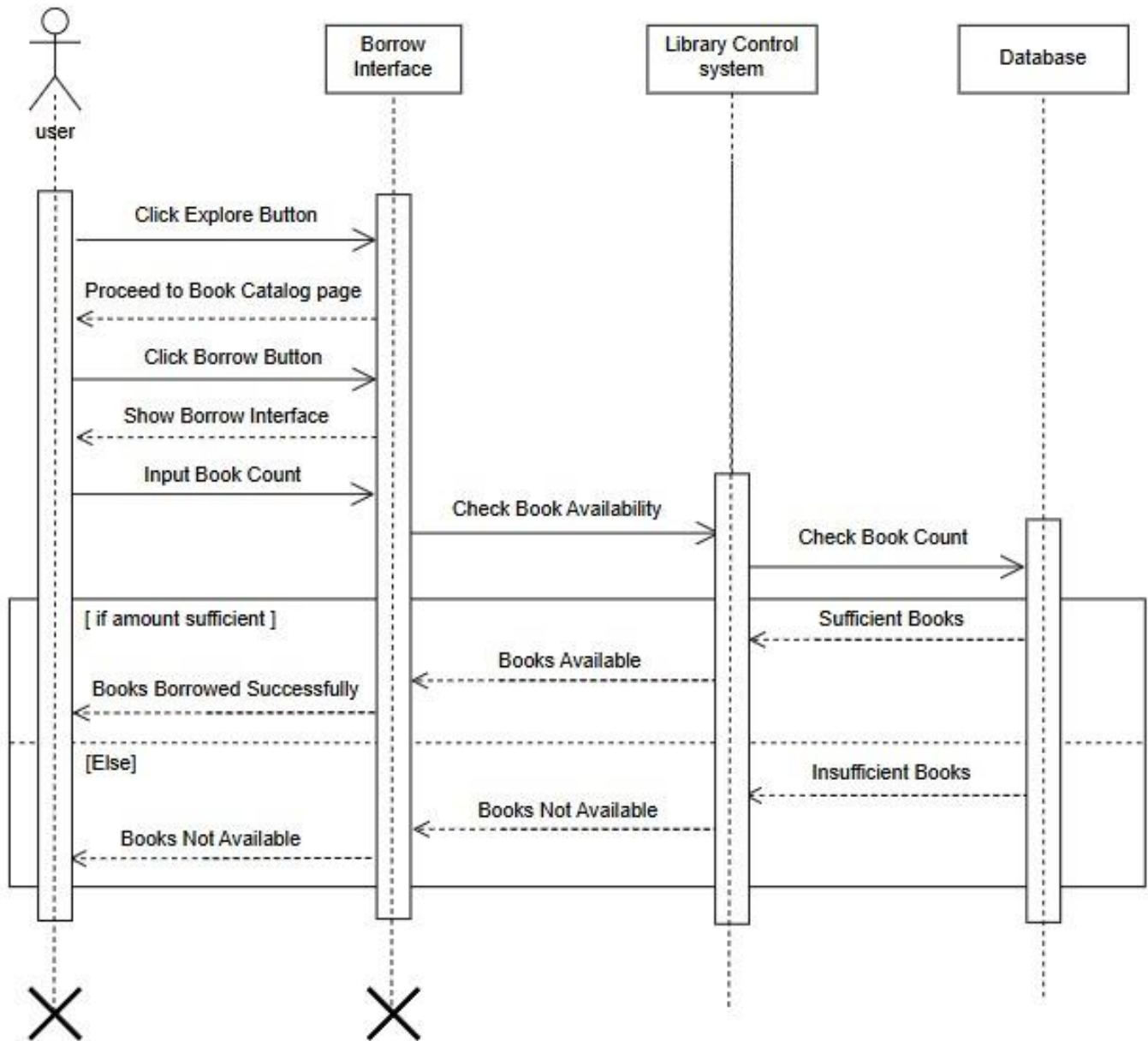
SEQUENCE DIAGRAM FOR SEARCH

Sequence Diagram for Search

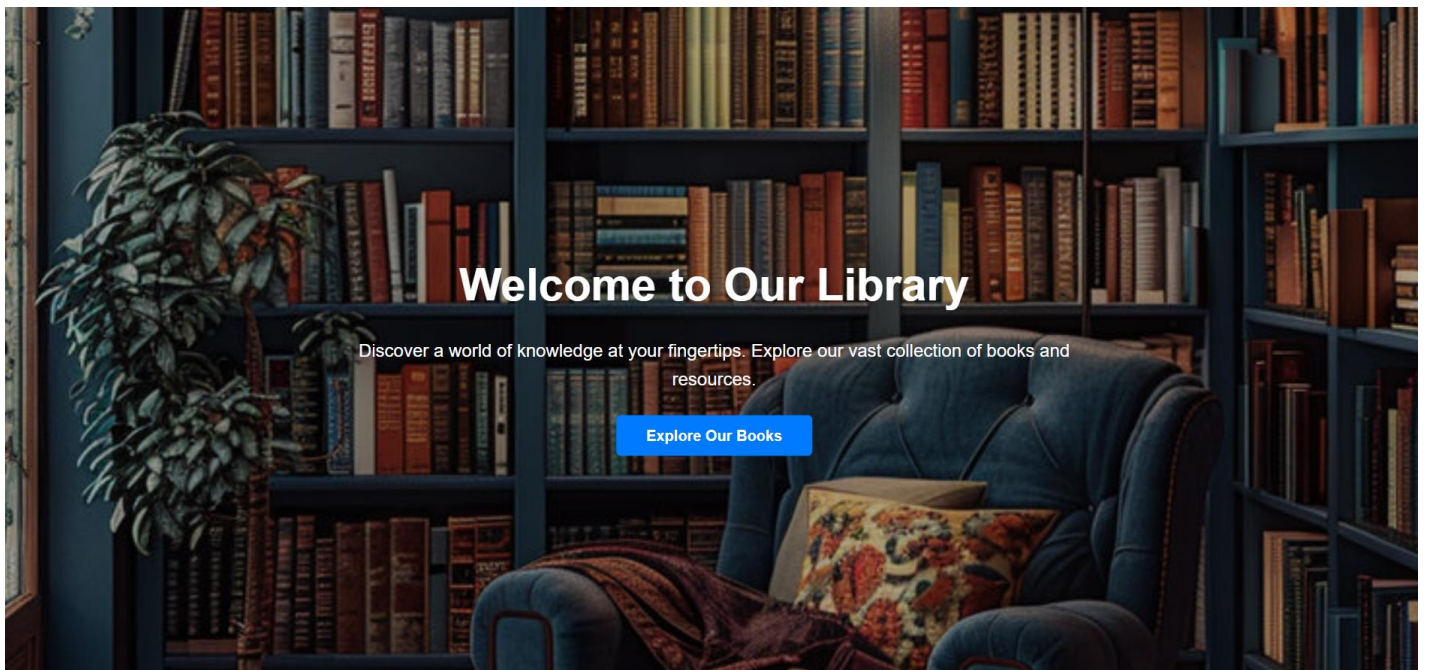


SEQUENCE DIAGRAM FOR BORROW

Sequence Diagram for Borrow



WEBSITE LANDING PAGE UI



WEBSITE MAIN PAGE UI

LIBRARY MANAGEMENT

HOME BOOKS CONTACT

Search Title name here.

Search

All Books

Textbooks

Programming

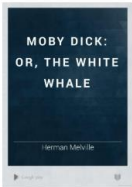
Literature

Self-Help

Fiction

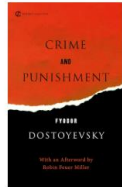
Science

History



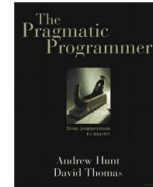
MOBY-DICK
Author: Herman Melville
Subject: Literature
Date: 2022-01-23

Stock: 12
[Borrow](#)



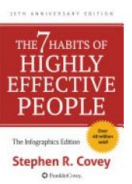
CRIME AND PUNISHMENT
Author: Fyodor Dostoevsky
Subject: Literature
Date: 2021-06-07

Stock: 15
[Borrow](#)



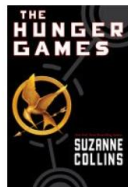
THE PRAGMATIC PROGRAMMER
Author: Andrew Hunt
Subject: Programming
Date: 2021-04-10

Stock: 47
[Borrow](#)



THE 7 HABITS OF HIGHLY EFFECTIVE PEOPLE
Author: Stephen R. Covey
Subject: Self-Help
Date: 2021-01-22

Stock: 16
[Borrow](#)



THE HUNGER GAMES
Author: Suzanne Collins
Subject: Fiction
Date: 2021-06-12

Stock: 30
[Borrow](#)



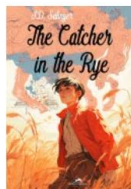
LEARNING JAVASCRIPT DESIGN PATTERNS
Author: Addy Osmani
Subject: Programming
Date: 2021-01-17

Stock: 49
[Borrow](#)



THE BROTHERS KARAMAZOV
Author: Fyodor Dostoevsky
Subject: Literature
Date: 2020-12-12

Stock: 37
[Borrow](#)



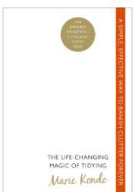
THE CATCHER IN THE RYE
Author: J.D. Salinger
Subject: Literature
Date: 2021-06-15

Stock: 34
[Borrow](#)



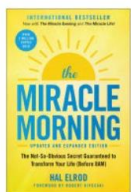
THE SUBTLE ART OF NOT GIVING A F*CK
Author: Mark Manson
Subject: Self-Help
Date: 2022-04-08

Stock: 23
[Borrow](#)



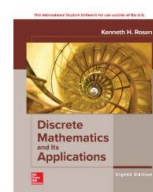
THE LIFE-CHANGING MAGIC OF TIDYING UP
Author: Marie Kondo
Subject: Self-Help
Date: 2022-05-02

Stock: 20
[Borrow](#)



THE MIRACLE MORNING
Author: Hal Elrod
Subject: Self-Help
Date: 2020-11-25

Stock: 42
[Borrow](#)



DISCRETE MATHEMATICS AND ITS APPLICATIONS
Author: Kenneth H. Rosen
Subject: Textbooks
Date: 2021-03-10

Stock: 22
[Borrow](#)

WEBSITE LANDING PAGE (HTML)

```
1  <!DOCTYPE html>
2  <html lang="en">
3  <head>
4    <meta charset="UTF-8">
5    <meta name="viewport" content="width=device-width, initial-scale=1.0">
6    <title>Library Management - Home</title>
7    <link rel="stylesheet" href="style.css"/>
8    <style>
9      body {
10        margin: 0;
11        font-family: 'Poppins', sans-serif;
12        background-color: #f4f4f4;
13      }
14    </style>
15  </head>
16  <body>
17    <div class="landing-container">
18      <!-- Background Image -->
19      <div class="landing-image">
20        
21      </div>
22
23      <!-- Welcome, Section -->
24      <div class="landing-content">
25        <h1>Welcome to Our Library</h1>
26        <p>
27          Discover a world of knowledge at your fingertips. Explore our vast collection of books and resources.
28        </p>
29        <a href="index.html">Explore Our Books</a>
30      </div>
31    </div>
32  </body>
33 </html>
```

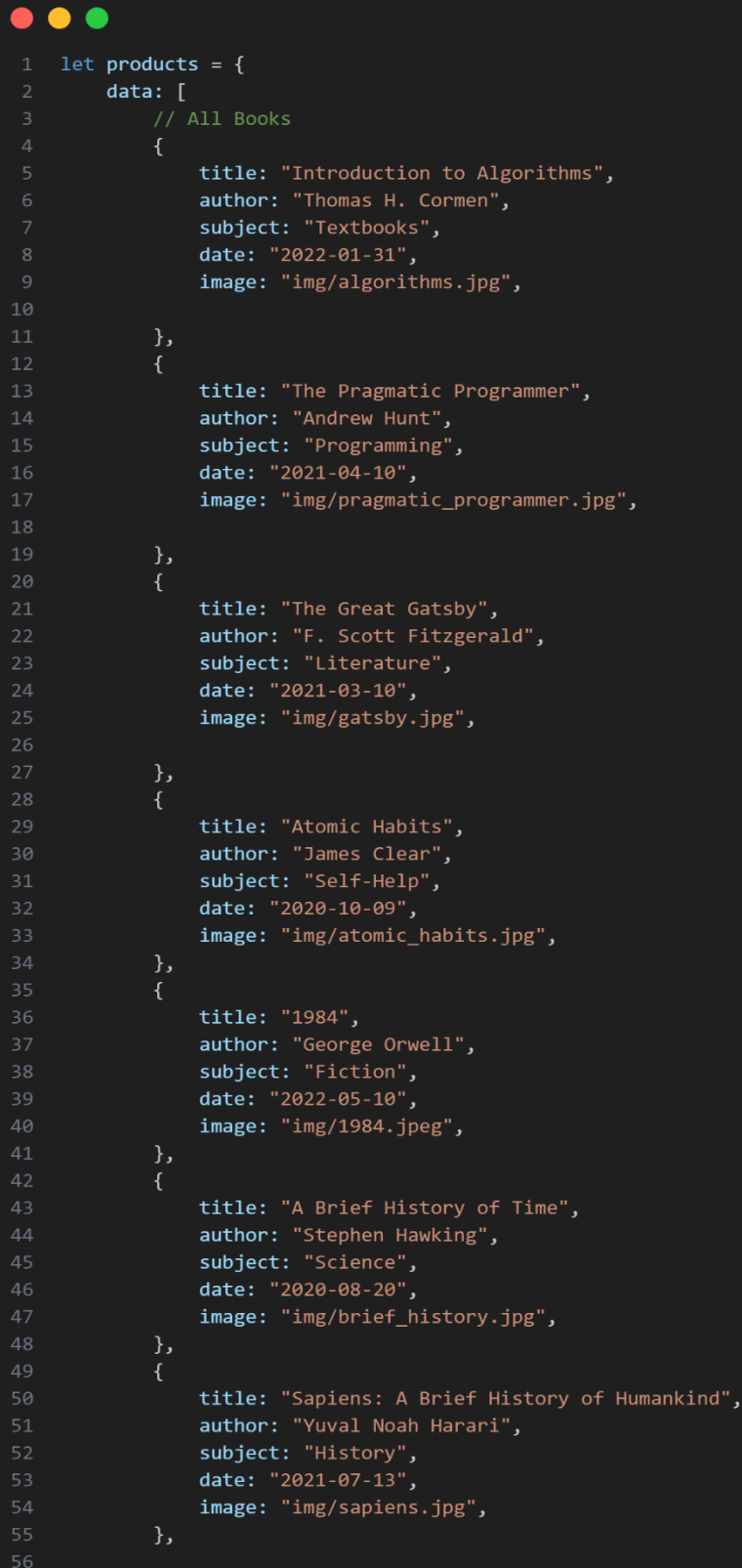

WEBSITE USER INTERFACE (HTML)

```
1 <!DOCTYPE html>
2 <html lang="en">
3 <head>
4   <meta name="viewport" content="width=device-width, initial-scale=1.0"/>
5   <title>Library Management</title>
6   <link rel="stylesheet" href="https://cdnjs.cloudflare.com/ajax/libs/font-awesome/4.7.0/css/font-awesome.min.css">
7   <link href="https://fonts.googleapis.com/css2?family=Poppins:wght@400;500&display=swap" rel="stylesheet"/>
8   <link rel="stylesheet" href="style.css"/>
9   <script src="https://cdn.jsdelivr.net/npm/sweetalert2@11"></script>
10 </head>
11 <header class="header">
12   <h1 class="logo"><a href="index.html">Library Management</a></h1>
13   <ul class="main-nav">
14     <li><a href="Home.html">Home</a></li>
15     <li><a href="#">Books</a></li>
16     <li><a href="#">Contact</a></li>
17   </ul>
18 </header>
19
20 <body>
21 <div class="wrapper">
22   <div id="search-container">
23     <input type="search" id="search-input" placeholder="Search Title name here.."/>
24     <button id="search">Search</button>
25   </div>
26   <div id="buttons">
27     <button class="button-value" onclick="filterProduct('all')">All Books</button>
28     <button class="button-value" onclick="filterProduct('Textbooks')">Textbooks</button>
29     <button class="button-value" onclick="filterProduct('Programming')">Programming</button>
30     <button class="button-value" onclick="filterProduct('Literature')">Literature</button>
31     <button class="button-value" onclick="filterProduct('Self-Help')">Self-Help</button>
32     <button class="button-value" onclick="filterProduct('Fiction')">Fiction</button>
33     <button class="button-value" onclick="filterProduct('Science')">Science</button>
34     <button class="button-value" onclick="filterProduct('History')">History</button>
35   </div>
36
37   <div id="Books">
38     <!-- Books will be dynamically generated here -->
39   </div>
40 </div>
41 <script src="script.js"></script>
42 <script src="https://cdn.jsdelivr.net/npm/sweetalert2@11"></script>
43 </body>
44
45 <footer>
46   <div class="Footer">
47     <div class="row">
48       <a href="#"><i class="fa fa-github"></i></a>
49       <a href="#"><i class="fa fa-instagram"></i></a>
50       <a href="#"><i class="fa fa-youtube"></i></a>
51       <a href="#"><i class="fa fa-twitter"></i></a>
52     </div>
53     <div class="row">
54       <ul>
55         <li><a href="#">Contact us</a></li>
56         <li><a href="#">Privacy Policy</a></li>
57         <li><a href="#">Terms & Conditions</a></li>
58       </ul>
59     </div>
60   </div>
61 </footer>
62 </html>
```


PART OF WEBSITE USER INTERFACE (CSS)

```
1  * {
2    padding: 0;
3    margin: 0;
4    box-sizing: border-box;
5    border: none;
6    outline: none;
7    font-family: "Poppins", sans-serif;
8  }
9
10 body {
11   background-color: #f5f8ff;
12 }
13
14 .wrapper {
15   width: 95%;
16   margin: 0 auto;
17 }
18
19 #search-container {
20   margin: 1em 0;
21 }
22
23 #search-container input {
24   background-color: transparent;
25   width: 40%;
26   border-bottom: 2px solid #110f29;
27   padding: 1em 0.3em;
28 }
29
30 #search-container input:focus {
31   border-bottom-color: #6759ff;
32 }
33
34 #search-container button {
35   padding: 1em 2em;
36   margin-left: 1em;
37   background-color: #6759ff;
38   color: #ffffff;
39   border-radius: 5px;
40   margin-top: 0.5em;
41 }
42
43 .button-value {
44   border: 2px solid #6759ff;
45   padding: 1em 2.2em;
46   border-radius: 3em;
47   background-color: transparent;
48   color: #6759ff;
49   cursor: pointer;
50 }
51
52 .active {
53   background-color: #6759ff;
54   color: #ffffff;
55 }
56
57 #Books {
58   display: grid;
59   margin-left: 100px;
60   grid-template-columns: auto auto auto;
61   grid-column-gap: 1.5em;
62   padding: 2em 0;
63 }
64
65 .card {
66   background-color: #ffffff;
67   max-width: 18em;
68   margin-top: 1em;
69   padding: 1em;
70   border-radius: 5px;
71   box-shadow: 1em 2em 2.5em rgba(1, 2, 68, 0.08);
72 }
73
74 .image-container {
75   text-align: center;
76 }
77
78 img {
79   max-width: 100%;
80   object-fit: contain;
81   height: 15em;
82 }
83
84 .container {
85   padding-top: 1em;
86   color: #110f29;
87 }
88
89 .container h5 {
90   font-weight: 500;
91 }
92
93 .hide {
94   display: none;
95 }
96
```

PART OF WEBSITE USER INTERFACE (JS)



```
1  let products = {
2    data: [
3      // All Books
4      {
5        title: "Introduction to Algorithms",
6        author: "Thomas H. Cormen",
7        subject: "Textbooks",
8        date: "2022-01-31",
9        image: "img/algorithms.jpg",
10     },
11     {
12       title: "The Pragmatic Programmer",
13       author: "Andrew Hunt",
14       subject: "Programming",
15       date: "2021-04-10",
16       image: "img/pragmatic_programmer.jpg",
17     },
18     {
19       title: "The Great Gatsby",
20       author: "F. Scott Fitzgerald",
21       subject: "Literature",
22       date: "2021-03-10",
23       image: "img/gatsby.jpg",
24     },
25     {
26       title: "Atomic Habits",
27       author: "James Clear",
28       subject: "Self-Help",
29       date: "2020-10-09",
30       image: "img/atomic_habits.jpg",
31     },
32     {
33       title: "1984",
34       author: "George Orwell",
35       subject: "Fiction",
36       date: "2022-05-10",
37       image: "img/1984.jpeg",
38     },
39     {
40       title: "A Brief History of Time",
41       author: "Stephen Hawking",
42       subject: "Science",
43       date: "2020-08-20",
44       image: "img/brief_history.jpg",
45     },
46     {
47       title: "Sapiens: A Brief History of Humankind",
48       author: "Yuval Noah Harari",
49       subject: "History",
50       date: "2021-07-13",
51       image: "img/sapiens.jpg",
52     },
53   ],
54 }
55
56
```



```
1 // Filter functionality
2 function filterProduct(value) {
3     let buttons = document.querySelectorAll(".button-value");
4     buttons.forEach((button) => {
5         if (value.toUpperCase() === button.innerText.toUpperCase()) {
6             button.classList.add("active");
7         } else {
8             button.classList.remove("active");
9         }
10    });
11
12    let elements = document.querySelectorAll(".card");
13    elements.forEach((element) => {
14        if (value === "all" || element.classList.contains(value)) {
15            element.classList.remove("hide");
16        } else {
17            element.classList.add("hide");
18        }
19    });
20 }
21
22 // Search functionality
23 document.getElementById("search").addEventListener("click", () => {
24     let searchInput = document.getElementById("search-input").value.trim();
25     let elements = document.querySelectorAll(".title");
26     let cards = document.querySelectorAll(".card");
27     let found = false;
28
29     elements.forEach((element, index) => {
30         if (element.innerText.includes(searchInput.toUpperCase())) {
31             cards[index].classList.remove("hide");
32             found = true;
33         } else {
34             cards[index].classList.add("hide");
35         }
36     });
37
38     // Show error if no book matches
39     if (!found) {
40         Swal.fire({
41             icon: "error",
42             title: "Oops...",
43             text: "No books found matching your search!",
44         });
45     }
46 });
47
```



```
1 // Shuffle function to randomly shuffle the books array
2 function shuffleArray(array) {
3     for (let i = array.length - 1; i > 0; i--) {
4         const j = Math.floor(Math.random() * (i + 1));
5         [array[i], array[j]] = [array[j], array[i]]; // Swap elements
6     }
7 }
8
9 // Random stock generator function
10 function generateRandomStock(min, max) {
11     return Math.floor(Math.random() * (max - min + 1)) + min;
12 }
13
```